

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

JIANG, et al.

Application No.: Unassigned

Filed:

For: METHOD AND APPARATUS FOR  
VERTICAL BOARD CONSTRUCTION  
OF FIBER OPTIC  
TRANSMITTERS, RECEIVERS AND  
TRANSCEIVERS

Examiner: Unassigned

Expected Art Group: 2874

Which is a Continuation of:

JIANG, et al.

Serial No.: 09/320,409

Filed: May 26, 1999

For: METHOD AND APPARATUS FOR  
VERTICAL BOARD CONSTRUCTION  
OF FIBER OPTIC  
TRANSMITTERS, RECEIVERS AND  
TRANSCEIVERS

Assistant Commissioner of Patents  
Washington, D.C. 20231

PRELIMINARY AMENDMENT

ACCOMPANYING

35 USC 120 and 37 CFR 1.53(b)(1) CONTINUATION APPLICATION

Dear Sir:

Prior to a first examination in the 35 USC 120 and 37 CFR  
1.53(b)(1) continuation application filed herewith, please enter  
the following amendments and remarks.

IN THE DRAWINGS

Applicant has amended FIG. 6A changing reference number 421 pointing to the fiber ferrules to 422.

Applicant has amended FIG. 3H adding the reference number 322 to the lead line pointing to the cavity 322.

IN THE SPECIFICATION

Page 2, line 1, prior to "FIELD OF THE INVENTION" please insert

--CROSS REFERENCE TO RELATED APPLICATIONS

This application claims the benefit and is a continuation of U.S. Application No. 09/320,409 filed May 26, 1999 by Jiang et al, now issued as U.S. Patent No. \_\_\_\_\_.--

Page 24, line 18, rewrite "receiver111" as --receiver 111--

Page 25, line 6, rewrite "fiber ferrules 421" as --fiber ferrules 422--.

Page 25, line 7, rewrite "fiber ferrules 421" as --fiber ferrules 422--.

IN THE CLAIMS

Please cancel claims 1-59 without prejudice.

Please add new claims 60-91 as follows:

1       --60. (New)     A fiber optic module comprising:  
2       a first optoelectronic device to couple photons into or  
3       receive photons out of a first optical fiber;  
4       a first printed circuit board coupled to the first  
5       optoelectronic device parallel to an optical axis of the first  
6       optoelectronic device, the first printed circuit board having  
7       one or more pins; and  
8       a shielded housing around the first printed circuit board  
9       to reduce electromagnetic interference (EMI).

1       61. (New) The fiber optic module of claim 60 wherein,  
2       the first optoelectronic device has a first terminal  
3       electrically coupled to one side of the first printed circuit  
4       board and a second terminal electrically coupled to an opposite  
5       side of the first printed circuit board.

1           62. (New) The fiber optic module of claim 60 wherein,  
2           the first printed circuit board is a vertical printed  
3 circuit board perpendicular to a horizontal plane and the  
4 optical axis of the first optoelectronic device is parallel to  
5 the horizontal plane.

1           63. (New) The fiber optic module of claim 60 wherein,  
2           the fiber optic module mounts to a system printed circuit  
3 board such that the first printed circuit board is perpendicular  
4 to the system printed circuit board and the optical axis of the  
5 first optoelectronic device is parallel to the system printed  
6 circuit board.

1           64. (New) The fiber optic module of claim 63 wherein,  
2           the one or more pins of the first printed circuit board  
3 couple to the system printed circuit board.

1           65. (New) The fiber optic module of claim 63 wherein,  
2           the one or more pins of the first printed circuit board  
3 couple to a connector of the system printed circuit board.

1           66. (New) The fiber optic module of claim 60 further  
2 comprising:

3 a first lens to focus photons between the first  
4 optoelectronic device and the optical fiber.

1 67. (New) The fiber optic module of claim 60 wherein:  
2 the shielded housing is electrically coupled to ground.

1 68. (New) The fiber optic module of claim 67 wherein:  
2 the shielded housing electrically couples to ground by  
3 coupling to a system chassis.

1 69. (New) The fiber optic module of claim 67 wherein:  
2 the shielded housing electrically couples to ground through  
3 a trace on the first printed circuit board which is coupled to  
4 one of the one or more pins of the first printed circuit board.

1 70. (New) The fiber optic module of claim 60 wherein,  
2 the shielded housing has a base, the base having one or  
3 more openings from which the one or more pins of the first  
4 printed board extend.

1 71. (New) The fiber optic module of claim 60 further  
2 comprising:  
3 a base coupled to the shielded housing, the base having one  
4 or more openings from which the one or more pins of the first

5 printed board extend.

1 72. (New) The fiber optic module of claim 60 further  
2 comprising:

3 a nose to receive an optical fiber connector and hold an  
4 optical fiber substantially fixed and aligned with the optical  
5 axis of the first optoelectronic device.

1 73. (New) The fiber optic module of claim 72 wherein,  
2 the nose provides shielding to reduce electromagnetic  
3 interference (EMI).

4 74. (New) The fiber optic module of claim 60 further  
5 comprising:

6 a second optoelectronic device to receive photons out of or  
7 couple photons into a second optical fiber;

8 a second printed circuit board parallel to the first  
9 printed circuit board, the second printed circuit board coupled  
10 to the second optoelectronic device parallel to an optical axis  
11 of the second optoelectronic device, the second printed circuit  
board having a second plurality of pins; and wherein,  
the shielded housing is around the first and second printed  
circuit boards to reduce electromagnetic interference (EMI).

1           75. (New) The fiber optic module of claim 74 wherein,  
2           the second optoelectronic device has a first terminal  
3           coupled to one side of the second printed circuit board and a  
4           second terminal coupled to an opposite side of the second  
5           printed circuit board.

1           76. (New) The fiber optic module of claim 74 wherein,  
2           the shielded housing has a base, the base having openings  
3           from which the one or more pins of the first printed board  
4           extend and the one or more pins of second printed circuit board  
5           extend.

1           77. (New) The fiber optic module of claim 74 further  
2           comprising:  
3           a base coupled to the shielded housing, the base having  
4           openings from which the one or more pins of the first printed  
5           board extend and the one or more pins of second printed circuit  
6           board extend.

1           78. (New) The fiber optic module of claim 74 further  
2           comprising:  
3           a nose to receive a first optical fiber connector and hold  
4           a first optical fiber substantially fixed and aligned with the

5 optical axis of the first optoelectronic device and to receive a  
6 second optical fiber connector and hold a second optical fiber  
7 substantially fixed and aligned with the optical axis of the  
8 second optoelectronic device.

1 79. (New) The fiber optic module of claim 78 wherein,  
2 the nose provides shielding to reduce electromagnetic  
3 interference (EMI).

1 80. (New) The fiber optic module of claim 74 wherein,  
2 the first printed circuit board and the second printed  
3 circuit board are vertical printed circuit boards perpendicular  
4 to a horizontal plane.

1 81. (New) The fiber optic module of claim 74 wherein,  
2 the first printed circuit board and the second printed  
3 circuit board are vertical printed circuit boards perpendicular  
4 to a system printed circuit board when the fiber optic module is  
5 mounted thereto.

1 82. (New) The fiber optic module of claim 74 further  
2 comprising:  
3 an internal shield between the first printed circuit board  
4 and the second printed circuit board and parallel therewith



5       and wherein, the shielded housing is around the first  
6       printed circuit board, the internal shield, and the second  
7       printed circuit board to reduce electromagnetic interference  
8       (EMI).

1       83. (New) A fiber optic module for coupling photons between  
2       optoelectronic devices and optical fibers, the fiber optic  
3       module comprising:

4       a base to mount the fiber optic transceiver in a system to  
5       couple photons between optoelectronic devices and optical  
6       fibers;

7       a first printed circuit board perpendicular to the base,  
8       the first printed circuit board having a pin inserted through a  
9       first opening in the base;

10       a first optoelectronic device having terminals coupled to  
11       the first printed circuit board, the first optoelectronic device  
12       having an optical axis parallel to the first printed circuit  
13       board;

14       a second printed circuit board perpendicular to the base  
15       and parallel to the first printed circuit board, the second  
16       printed circuit board having a pin inserted through a second  
17       opening in the base;

18       a second optoelectronic device having terminals coupled to  
19       the second printed circuit board, the second optoelectronic

20 device having an optical axis parallel to the second printed  
21 circuit board; and  
22 a shielded housing coupled to the base, the shielded  
23 housing to encase the first printed circuit board and the second  
24 printed circuit board to reduce electromagnetic interference  
25 (EMI).

1 84. (New) The fiber optic module of claim 83 further  
2 comprising:

3 an internal shield between the first printed circuit board  
4 and the second printed circuit board and parallel therewith  
5 and wherein, the shielded housing encases the first printed  
6 circuit board, the internal shield, and the second printed  
7 circuit board to reduce electromagnetic interference (EMI).

1 85. (New) The fiber optic module of claim 83 wherein,  
2 the internal shield provides shielding to reduce crosstalk  
3 between the first printed circuit board and the second printed  
4 circuit board.

1 86. (New) The fiber optic module of claim 83 further  
2 comprising:  
3 a first lens to focus photons between the first  
4 optoelectronic device and a first optical fiber; and

5           a second lens to focus photons between the second  
6   optoelectronic device and a second optical fiber.

1           87. (New) The fiber optic module of claim 83 wherein,  
2           the first printed circuit board and the second printed  
3   circuit board are vertical printed circuit boards perpendicular  
4   to a horizontal plane.

1           88. (New) The fiber optic module of claim 83 wherein,  
2           the first printed circuit board and the second printed  
3   circuit board are vertical printed circuit boards perpendicular  
4   to a horizontal system printed circuit board when the fiber  
5   optic module is mounted thereto.

1           89. (New) The fiber optic module of claim 83 further  
2   comprising:  
3           a nose coupled to the base, the nose to receive an optical  
4   fiber connector to align a pair of optical fibers with the  
5   optical axis of the first optoelectronic device and the optical  
6   axis of the second optoelectronic device.

1           90. (New) The fiber optic module of claim 89, wherein,  
2           the nose includes shielding to reduce electromagnetic  
3   interference.

1           91. (New) The fiber optic module of claim 83, wherein,  
2           the fiber optic module is a fiber optic transceiver and  
3           wherein  
4           the first optoelectronic device is a photodetector,  
5           and  
6           the second optoelectronic device is an emitter.

1           92. (New) The fiber optic module of claim 84, wherein,  
2           the emitter is a vertical cavity surface emitting laser  
3           (VCSEL).

4           93. (New) The fiber optic module of claim 83 wherein,  
5           the first optoelectronic device has a first terminal  
6           electrically coupled to one side of the first printed circuit  
7           board and a second terminal electrically coupled to an opposite  
8           side of the first printed circuit board, and  
9           the second optoelectronic device has a first terminal  
10          electrically coupled to one side of the second printed circuit  
11          board and a second terminal electrically coupled to an opposite  
12          side of the second printed circuit board.

1           94. (New) A method of assembling a fiber optic module, the  
2           method comprising:

3 providing a first printed circuit board and coupling  
4 terminals of a first optoelectronic device to the first printed  
5 circuit board such that an optical axis of the first  
6 optoelectronic device is parallel with the first printed circuit  
7 board;

8 providing a second printed circuit board and coupling  
9 terminals of a second optoelectronic device to the second  
10 printed circuit board such that an optical axis of the second  
11 optoelectronic device is parallel with the second printed  
12 circuit board; and

13 encasing the first printed circuit board and the second  
14 printed circuit board by a shielded housing such that the first  
15 printed circuit board is parallel with the second printed  
16 circuit board and the optical axis of the first optoelectronic  
17 device is parallel with the optical axis of the second  
18 optoelectronic device.

1 95. (New) The method of claim 94 further comprising:  
2 coupling a base to the shielded housing perpendicular to  
3 the first printed circuit board and the second printed circuit  
4 board.

1 96. (New) The method of claim 94 further comprising:  
2 prior to encasing the first printed circuit board and the

3 second printed circuit board by the shielded housing,  
4 inserting an internal shield between the first printed  
5 circuit board and the second printed circuit board.

1 97. (New) The method of claim 94 wherein,  
2 the first printed circuit board and the second printed  
3 circuit board are vertical printed circuit boards perpendicular  
4 to a horizontal plane.

1 98. (New) The method of claim 94 wherein,  
2 the first printed circuit board and the second printed  
3 circuit board are vertical printed circuit boards perpendicular  
4 to a horizontal system printed circuit board when the fiber  
5 optic module is mounted thereto.

1 99. (New) The method of claim 94 wherein,  
2 the first optoelectronic device has a first terminal  
3 electrically coupled to one side of the first printed circuit  
4 board and a second terminal electrically coupled to an opposite  
5 side of the first printed circuit board, and  
6 the second optoelectronic device has a first terminal  
7 electrically coupled to one side of the second printed circuit  
8 board and a second terminal electrically coupled to an opposite  
9 side of the second printed circuit board.--

### REMARKS

Prior to a first examination of the continuation patent application filed herewith, please enter the foregoing amendments and the following remarks.

Applicant has cancelled claims 1-59 without prejudice. Applicant has added claims 60-99. Claims 60-99 remain at issue in the patent application. Applicant believes no new matter has been added.

The application papers filed herewith are a true copy of the prior complete application filed on May 26, 1999 having Application No. 09/320,409. Pursuant to 35 U.S.C. 120 and 37 CFR 1.78(a), this continuation application filed under 37 CFR 1.53(b) is a continuation of Application No. 09/320,409 filed on May 26, 1999 and claims the benefit thereof.

Examination and reconsideration of this case is respectfully requested in view of the foregoing amendments and the following remarks.

#### I) DRAWINGS

Applicant has amended FIG. 3H and 6A as shown in pink highlighter in the attached "Request for Approval of Drawing Changes".

Applicant has amended FIG. 3H adding the reference number 322 to the lead line pointing to the cavity 322. Applicant has amended FIG. 6A changing reference number 421 pointing to the fiber ferrules to 422.

Applicant respectfully requests approval of the drawing changes and submits a duplicate of the drawing changes for the draftsperson's review.

II) SPECIFICATION

Applicant has amended the specification to correct the reference number designation of "fiber ferrules 421" to --fiber ferrules 422-- in accordance with the drawing changes to avoid duplicate reference number designations.

III) NEW CLAIMS

Applicant has added new claims 60-99. New claims 60, 83 and 94 are independent claims. New claims 61-82 and 84-93, and 95-99 are dependent claims depending directly or indirectly from independent claims 60, 83 and 94, respectfully.



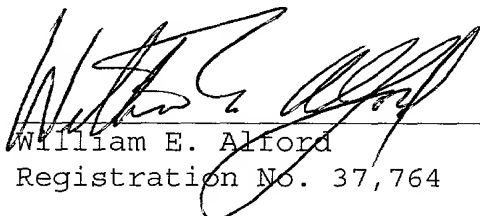
CONCLUSION

A first examination is respectfully requested in view of the foregoing amendments and remarks. Allowance of the claims at an early date is solicited.

The examiner is invited to contact Applicant's undersigned counsel by telephone at (714) 557-3800 to expedite the prosecution of this case should there be any unresolved matters remaining. Please charge any shortage in fees in connection with the filing of this paper to Deposit Account 02-2666 and please credit any excess fees to such deposit account.

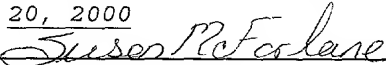
Respectfully submitted  
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN, LLP

Dated: December 20, 2000

  
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